

Holistic, participatory and strategic: A vulnerability and adaptation assessment for Pacific communities faced with climate change

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ABSTRACT

Community-based climate change vulnerability and adaptation assessments are burgeoning, matched by an expanding body of literature on vulnerability, resilience, adaptive capacity and adaptation. However, too often, these assessments are subjective, rapid and merely consultative which can lead to a lack of community ownership over adaptation projects and potential failure. This has been particularly common in the so-called 'frontline' states where large donor funding has flowed to in the last decade or more. Despite extensive local knowledge of environmental change and strategies to respond to such, the Pacific region is often depicted as 'most vulnerable' to the impacts of climate change; however, a one-size-fits-all vulnerability and adaptation assessment is challenging to develop effectively. This article provides details of the development and use of a community-based vulnerability and adaptation assessment that has been applied in 15 countries and close to 40 communities throughout the Pacific region. The assessment is not a single prescribed method; it is an approach that can be adapted to diverse communities and places and ensure a shared and open dialogue between external parties and local communities. It involves a number of critical steps and utilises a variety of techniques to collect data including field observations, in-depth focus group discussions, field assessments and group workshops. Three overarching principles guide the assessment. These include the need to: holistically capture the numerous assets that communities utilise to sustain their livelihoods (as vulnerability can be influenced by a host of factors); guarantee community participation and an ongoing two-way dialogue and sharing of knowledge; and ensure that medium and long-term community plans and goals are developed to help safeguard the sustainability and longevity of these communities.

Keywords: adaptation, community, environmental change, islands, Pacific, vulnerability

INTRODUCTION

In recent years, climate change scientists, practitioners and policy-makers have shifted their focus to adaptation in recognition that mitigation alone will not prevent climate change impacts even if lowered emission trajectories are achieved (Campbell, 2009; Petheram et al., 2010; Pielke et al., 2007). Climate change mitigation policy must largely be driven at the international level because the exposure of a nation or community to climate change impacts is not solely a function of their own behaviour. In contrast, climate change adaptation, as argued by Garnaut (2008, p.363), 'is best seen as a local, bottom-up response... households, communities and businesses are best placed to make the decisions that will preserve their livelihoods and help maintain the things they value'. This view needs to be tempered by the reality that different groups of people may be more or less able to adapt to climate change based not only on their exposure to such impacts but also the root causes of vulnerability, such as poverty, inequitable access to critical assets, poor governance, limited power to make decisions about one's future and so on (Ayers & Dodman, 2010; Ribot, 2014). As such, vulnerability to climate change impacts may not necessarily be reduced by adaptation interventions unless these root causes are understood and overcome (see Adger et al., 2009a; Adger et al., 2009b; Nelson, 2009).

Communities throughout the Pacific region are often pitched as 'most vulnerable' to the impacts of climate change (IPCC, 2007; Keener et al., 2012). There is an abundance of literature that cites numerous current and projected climatic changes in the Pacific, such as increasing temperatures, ocean acidification, changes in rainfall patterns, increasing intensity of tropical storms and cyclones, sea level rise and changes in climate variability associated with the El-Niño Southern Oscillation climate system in the region (Barnett & Campbell, 2010; IPCC, 2014; Kelman & West, 2009; Mimura et al., 2007; Preston et al., 2006). The human impacts of such changes include declining food and water security, loss of agricultural lands, human health implications, threats to key industries such as tourism, economic losses, and damages to coastal infrastructure and human settlements (Barnett & Campbell, 2010; Kelman & West, 2009). While adaptation to local environmental variability and change is not something new for Pacific communities, the magnitude of impacts as a result of climate change is unprecedented (Heltberg et al., 2009; Schipper, 2007). As such, new ways of understanding and responding to risk and vulnerability are needed. As highlighted by Hay and Mimura (2013, p.1), a diverse array of vulnerability assessments have been undertaken in communities across the region over the last decade or so and all point to the regions high level of 'risk to the adverse consequences of climate change'. Despite a flurry of community-based climate change adaptation interventions across the region, Pacific communities continue to face an ever-present level of vulnerability to the impacts of climate change (Hay & Mimura, 2013).

The Intergovernmental Panel on Climate Change (IPCC, 2007) has described climate change adaptation as the adjustment in natural or anthropogenic systems in response to actual or projected changes and subsequent impacts, which may moderate harm or exploit beneficial opportunities. However, adaptation is not seamless. A key concern for many engaged in climate change adaptation work is that appropriate and effective adaptation is not as achievable or sustainable as is commonly implied (Adger & Barnett, 2009; Marino & Ribot, 2012). At the community level

for instance, where the bulk of adaptation interventions are transpiring, there are complexities to do with social dynamics, social stratification and power relations, which can impact on the success of these adaptation projects (see Buggy & McNamara, 2015; Cannon, 2002; Ensor & Berger, 2009). Adding further complication is the challenge of knowing exactly what people should be adapting to (Smit et al., 2000) and when, given the limitations of projections at the local level (e.g. McNamara, 2013). An overriding concern in all of this is that adaptation interventions may even result in maladaptation, which is when (often well-meaning) adaptation efforts actually increase the vulnerability of people and communities to climate change impacts (Barnett & O'Neill, 2010).

In response, this article details the steps and guiding principles of a Vulnerability and Adaptation (V&A) Assessment for the Pacific region (see Limalevu & McNamara, 2013). This was developed by the co-authors while working at the Pacific Centre for Environment and Sustainable Development (at the University of the South Pacific) as part of large climate change adaptation projects funded by Australian Aid and the European Union. To date, the V&A assessment has been used in 15 countries and close to 40 communities across the Pacific region to help design community-based climate change adaptation activities. These initiatives have ranged from: the development of community water supply systems to address water insecurity; to the construction of groynes and planting of mangroves to address coastal erosion and inundation; to the reinforcement of river banks with coconut tree logs and vetiver hedgerows to curb river bank erosion and flooding. Practitioners using the V&A assessment have provided positive feedback on its appropriateness and value, and media reports have commended the subsequent adaptation activities (see Silaitoga, 2013).

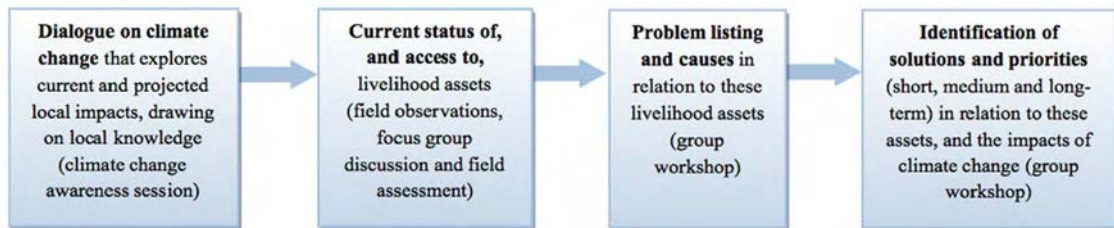
V&A ASSESSMENT FOR PACIFIC COMMUNITIES

The V&A assessment draws on the knowledge, experiences and aspirations of community members, and steers them through a process by which to identify appropriate and sustainable activities to enhance their capacity to respond to the impacts of climate change. It does so by undertaking field observations, focus group discussions, field assessments and group workshops to collect both qualitative and quantitative data. In the process of developing the specific V&A assessment components, we have drawn on and acknowledge the value of earlier, carefully planned and effective community-based V&A assessments used across the Pacific region and elsewhere (see Campbell & de Wet, 1999; Dazé et al., 2009; Nakalevu, 2006).

The V&A assessment is designed to gain insights into the vulnerability and adaptive capacity of communities, drawing on their stock of, access to, and concerns about livelihood assets. The assessment can take up to two weeks per community to complete, depending on weather conditions, the combined experience of the assessment team, the complexity of issues, and the availability of community members and leaders at the time of the visits. Given that the assessment team must respect the multiple time demands on community members and representatives, the V&A assessment process may have to occur over more than one site visit. Finally, it is important for the assessment team to always remember that the assessment process and subsequent activities need to be grounded in principles of sharing, respect, honesty and open communication.

This article details the steps for undertaking the V&A assessment, which practically leads communities through a logical process that: first, shares information about climate change (also drawing on local knowledge) in an awareness session; assesses the current status of, and access to, livelihood assets; lists problems and causes; identifies solutions and adaptation options; and finally, prioritises these options for implementation. This process is illustrated in Figure 1.

Figure 1: Step-by-step guide for undertaking the V&A assessment



This step-by-step process lends itself well to the collection of baseline data for monitoring and evaluation purposes. The data collected at each site from the focus group, field assessment and group workshop forms the basis for baseline data. Once projects have been implemented, the assessment team should re-convene the group workshop and go through the same process and ask the same questions on livelihood assets that were targeted in the initial assessment. This will then indicate any changes or improvements as a result of the project (in part or entirely).

STEP 1: CLIMATE CHANGE AWARENESS SESSION

The V&A assessment begins with a climate change awareness session in the community. This should be comprehensive in content but simplified to suit the current level of community understanding, without creating unnecessary fear about the impacts of climate change. Key tenants of this climate change awareness session should include causes, current and projected impacts, and potential adaptation responses. It is important for the assessment team to have an understanding of the level of climate change knowledge the community has prior to conducting this awareness session. This should have been ascertained during prior visits to the community (as part of the earlier rapid assessment necessary for initial site selection; detailed in Limalevu, 2012). Also, the assessment team should ensure beforehand that the venue and facilities are appropriate for conducting the awareness session.

If possible, it is important to gather meteorological information for these sites, most likely from the nearest meteorological station. Another useful source of information on climate change (current changes and projections) is the Australian Government's Pacific Science Climate Change Programme, which provides country-specific information (see Australian Bureau of Meteorology and CSIRO, 2011). There are other useful sources to access Pacific climate change information (see Barnett & Campbell, 2010; IPCC, 2014; Mimura et al., 2007; Preston et al., 2006). The findings from these studies should be used as part of the climate change awareness session. They should also be used throughout the V&A assessment, especially when finalising adaptation activities.

STEP 2: FOCUS GROUP DISCUSSION ON LIVELIHOOD ASSETS

Focus groups allow for a qualitative exploration of ‘multiple perceptions, values and attitudes that people hold towards particular issues’ (McGregor, 2004, p.142). Goss and Leinbach (1996) have argued that through small group settings, participants interact, argue and engage with each other. It is important to ensure that these focus group sessions encourage all involved to actively participate and share their views to avoid only a few to dominate the discussions (see Momsen, 2006; Scheyvens, 2014). Moreover, the involvement of women, men and younger community members is encouraged. The use of a qualitative approach is necessary to ensure that human voices are brought to the fore, instead of only relying on more quantitative forms of data collection such as vulnerability indices and other numerical indicators.

The focus group discussion is a critical component of the V&A assessment, and is guided by a series of questions. These questions are divided into the following broad assets:

1. Governance and socio-economic resources, including demography, human resources and development plans;
2. Community disaster risk preparedness and management;
3. Water resources and security;
4. Health and sanitation;
5. Energy resources and information communication technology;
6. Food resources and security; and
7. Natural resources – terrestrial, marine and freshwater.

For each of these asset areas, information is gathered on their overall status and access, which starts to build a picture of livelihoods, vulnerability and adaptive capacity. Some of this information may have been ascertained in the rapid assessment process (as mentioned earlier). It is important though to repeat the questions so as to cross-check on the previous responses, thereby validating the information gathered through triangulation.

STEP 3: DIGGING DEEPER WITH A FIELD ASSESSMENT

The field assessment follows the focus group discussion. The purpose of this component of the V&A assessment is two-fold: to make observations about these assets; and to verify issues that were raised and discussed in the focus group discussion. The group is split into three sub-groups, which should have equal representation of males and females, including youth. If committees of these broad asset areas exist in the community, then members of these should be assigned to the appropriate sub-groups. The first sub-group consists of 1 and 2 above, the second sub-group consists of 3, 4 and 5 above, and the third sub-group consists of 6 and 7 above. These asset areas are combined into the three sub-groups for ease of gathering data and making field observations, and for their close inter-linkages. For instance, food resources and security is grouped with

natural resources as both require traversing similar or nearby sites to make observations and gather data, often outside the confines of the settlement or village.

These sub-groups are then tasked to gather information and carry out an assessment related to their ascribed asset areas. Sub-group 1 continues on with a more in-depth discussion of governance and socio-economic resources to build on the information gathered in the focus group discussion. In particular, power and decision-making structures within the community are further discussed. This sub-group also more closely examines the vulnerability of community infrastructure, agriculture and the water supply system to the impacts of cyclones, droughts and flooding events.

Sub-group 2 inspects all water resources used by the community, including any community rainwater tanks or storage water tanks, and assesses the volume of discharge and water quality. This sub-group also carries out a health and sanitation assessment at both the household and community level. At the household level, a sample population is assessed for basic household hygiene; and at the community level, an inspection and categorisation of the types of waste disposal and toilets is undertaken. If possible, health data is obtained by the village nurse(s) but this information is to be treated with the utmost confidence. This sub-group also further investigates energy resources and information communication technology. Cooking facilities of a sample population are inspected, and an assessment of the fuel used and energy efficiency of the cooking methods is undertaken. The type(s), cost, accessibility and sustainability of the types of fuel used for lighting and other energy needs are also evaluated. In terms of information communication technology, further probing from the focus group discussion about its potential use and relevance for the community are pursued.

Sub-group 3 should survey a sample of farms to assess the types and volume of food resources available to the community. This could include an assessment of the soil fertility and productivity or yield of the various cultivated crops. The availability of basic food crops throughout the year should be assessed by documenting the cropping system. Assessment should also be made of the varieties of root crops, vegetables and fruit crops grown, which may provide a link, though not necessarily, to the health and nutritional status of the community. Building on the focus group discussion, an assessment of the marine resources and any livestock should also be included. Furthermore, this sub-group should assess the land-based natural resources with respect to the volume and state of the resources. This would include the: categorisation and volume of forest; categorisation and volume of wild crop harvest; presence and impacts of invasive species; potential ecosystem services for the community; and potential marketable resources. Building on the focus group discussion, the availability, accessibility and volume of marine and/or freshwater resources should also be documented. The results of these assessments could then be used as an indicator of the status of biodiversity in the area.

STEP 4: GROUP WORKSHOP TO UNDERSTAND PROBLEMS, CAUSES AND OPTIONS

Following the field assessment, all sub-groups should re-convene for a large group workshop. This workshop is divided into two sessions. Remaining in their nominated sub-groups from the field assessment, each sub-group undertakes an exercise to list key problems (or challenges), root

causes and potential solutions for their specific group asset areas. Groups should be encouraged to reflect on the findings gleaned from the focus group and field assessment. Each of the three sub-groups should discuss and list out core problems, and causes and solutions to such problems, and then report their findings to the entire group.

Following the presentations from the three sub-groups, all participating community members should now work together as one group to identify and prioritise adaptation activities based on the findings of the above session. The assessment team should facilitate this discussion and encourage the community to draw on the findings from the focus group, field assessment and the above 'problems, causes and solutions' exercise. The 'solutions' provided from each of the three sub-groups should be listed in a table as potential adaptation activities. Once they are all listed, the assessment team needs to encourage the community to indicate the most important activities for them and then facilitate a discussion whereby the community prioritises such activities. Information on current and projected climate change impacts should also be considered for each of these potential activities.

This group workshop should be open, interactive and respectful of any diverse opinions. The views of community representatives and leaders should also be carefully considered, as these adaptation activities need to be supported by community leaders as well as the broader community. The goal is to identify a series of prioritised adaptation activities that enhance community adaptive capacity. Ultimately, the aim of the V&A assessment is to ensure that these adaptation activities are: designed and endorsed by the community; technically feasible; cost-effective; culturally acceptable and appropriate; and sustainable. Once the community has prioritised these activities, the assessment team should accurately price them and finalise decisions on how to deliver such activities in the community.

CASE STUDY: NABOUWALU VILLAGE, ONO ISLAND, FIJI

The V&A assessment has been used in numerous countries and communities throughout the Pacific region to guide and inform adaptation interventions. One example of its use was in Nabouwalu village, which is a coastal village located on Ono Island in Fiji. It is a small island, north of the larger island of Kadavu. The area of the island is approximately fifteen square kilometres with a population of approximately 60 with 19 households. Here, an initial community consultation ('rapid assessment') was undertaken to gauge the community's level of need, willingness and acceptance of developing and implementing an adaptation project. This initial consultation also involved an assessment of the commitment and support from the Chief and community elders. Following this initial assessment, the decision was made to go ahead with the adaptation project in Nabouwalu village.

In collaboration with the community, the project team carried out the V&A assessment to ascertain the vulnerability of various assets to current and projected future impacts of climate change. An awareness session on the causes and impacts of climate change was also conducted. The key aims of the awareness session were to: impart knowledge about climate change and how this would likely impact their livelihood assets now and in the future, but also provide an opportunity for locals to share their knowledge of changes and experiences of adapting to

environmental change or extremes in the past or present. The findings from the V&A assessment were collated, including the prioritisation of adaptation activities, and presented to the whole community.

From the V&A assessment, water supply was listed as the highest priority to be addressed by the adaptation project. With the assistance of the Fiji Water Authority and guidance from the project team, a new water source was located and developed and a 10,000 litres ferro-cement water tank was constructed to store and transfer water to the village. Within the village, a new water reticulation system was constructed and each household was supplied with a tap and shower stand. The community members were involved in the whole process: assessment, prioritisation, planning and implementation. This approach was essential to ensure that the community took ownership of the project. The other essential element to sustaining the project, particularly the maintenance of the water supply system, was through the formation of a dedicated water committee. During the project implementation phase, the water committee members were given hands-on training in relation to construction, and water supply management and maintenance.

During the group workshop, the community were asked to formulate and develop a medium and long-term sustainable development vision and plan based on this priority list. This sustainable development plan ensured that there was commitment by the community to mobilise resources internally and attempt to source external funding to implement their plan. This would enable the community to address the current and projected future impacts of climate change and achieve their sustainable development goals.

The success of any climate change adaptation project can be judged in part by two core dimensions: 1) how a community takes ownership of the project; and 2) how a community develops a vision and plan to continue to address other vulnerable livelihood assets by mobilising both internal and external resources. Within the third year of this adaptation project, the Nabouwalu community went ahead with the implementation of a solar lighting project. As part of this project, one of the women in the village went to India for six months to train in solar lighting systems. Upon her return, the community constructed a small building for her workshop, which also supports the main solar panel and modem. The community have also embarked on developing their agricultural productivity for greater food security, subsistence purposes and for selling. For the economic crops, each of the men in the village were given certain targets to plant 'Yaqona' (*Piper methysticum*), a high value crop. In the area of disaster risk management, the community have taken it upon themselves to repair a suspension bridge over a river that separates two sections of the community. Their next major project is the construction of a jetty so that bigger boats can berth to facilitate the transportation of produce to the main market centres.

The case study illustrates how the V&A assessment approach can be effective due to its focus on the vulnerability of livelihood assets in the short, medium and long-term to bolster adaptive capacity. While such projects allow for initial climate change adaptation assistance through modest funding, this is put forward as a catalyst for sustainable community development in the medium and long-term.

DISCUSSION: GUIDING ASSESSMENT PRINCIPLES

Responses to climate change have largely pivoted around scientific, technological and economic solutions. While these are critical dimensions, equally too are the significant human dimensions. Focussing on people and how they make a living has driven the V&A assessment. As such, the V&A assessment draws insights from the sustainable livelihoods framework in recognition of the need for assessments to be *holistic* in their understanding of livelihoods. The sustainable livelihoods framework focuses on the capacity of individuals and communities to make a living, based on their stock of natural, social, human, physical and financial assets (Carney, 1998). Its usage provides a way of exploring root causes of vulnerability to climate change in relation to the availability of these assets and people's access to them (see Ribot, 2014). By exploring these assets we can begin to understand people's experiences, knowledge, beliefs and abilities in relation to risk and planning (Twigg, 2007). Drawing from the framework, capacity to adapt is in part determined by: individual or household characteristics and circumstances (particularly social stratification); individual livelihood assets that are able to embrace change and other opportunities; and external structures and processes that can determine people's access to certain assets and influence their ability to generate various livelihood strategies. Therefore, the V&A assessment holistically examines the status of, access to, and concerns relating to community, household and individual assets as an important component of understanding vulnerability and adaptive capacity. The sustainable livelihoods framework has a long-held relationship with researchers and practitioners in the development and poverty fields, but has rarely been applied in the climate change field making this a novel approach.

The V&A assessment provides a step-by-step guide for climate change adaptation practitioners to ensure that the experiences, local knowledge, beliefs and values of the community are at the core of the analysis and decision-making process. The community is placed at the centre of the assessment in the hope of avoiding their 'misrecognition as simplified, stereotyped victims' (Marino & Ribot, 2012, p.323). As such, the assessment is guided by the principles of Participatory Action Research, which places emphasis on participants' themselves to provide opinions, experiences and worldviews (Chambers, 1994; Pain & Francis, 2003). The assessment team needs to also be mindful of who is participating and involved in decision-making processes to ensure that all have an equal opportunity to participate and voice their concerns and aspirations (see Sen, 1981). Adopting such an approach ensures that local communities are directly involved in the assessment process, guaranteeing that they are active agents in making decisions about their future (Mercer et al., 2008). In this way, *community participation and representation* from all social groups (Marino & Ribot, 2012) is a critical guiding principle of the V&A assessment to allow for a shared dialogue between external parties (i.e. assessment team) and local communities. Often, work undertaken on climate change adaptation has been top down in its approach (Reid et al., 2009), with little attention given to communities' experiences, knowledge and aspirations relating to how to adapt to these changing environments.

The third and final guiding principle of the V&A assessment is about being *strategic*. Community-based assessments need to be mindful of the need to also develop a medium and long-term vision, with associated plans and goals, for a sustainable future in these communities. The objective of the V&A assessment is to document the status of, and access to, livelihood assets, along with the

most prominent problems facing each to prioritise short-term adaptation activities. Through this process of prioritisation, both medium and long-term plans and goals – that align with projected medium and long-term climate change impacts – need to be identified. Being strategic in this sense will hopefully set in motion a process that initiates and catalyses community actions to enable them to develop in a sustainable manner and respond to climate change impacts in the short, medium and long-term. Adaptation is a slow and long process and some interventions are not needed now – in fact, they may not be needed until the next generation – making this a critical step of the V&A assessment.

CONCLUSION

Overall, the V&A assessment is comprehensive and yet flexible. It involves a number of critical stages that are steered by core principles focused around holistic livelihood understandings, participatory approaches, and strategic medium and long-term sustainable development plans and goals. To date, a number of Pacific community members and practitioners have indicated that the V&A assessment is both locally and culturally appropriate. It is hoped that the overall V&A assessment, and its guiding principles, will help foster effective and sustainable adaptation interventions across the region now and into the future.

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